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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
~~WASHINGTON 25, D.C.~~
233 Forestry Bldg., Colo. A & M
Fort Collins, Colorado
November 30, 1949

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DEC 5 - 1949
R 3
TIMBER MANAGEMENT

To: Regional Forester, U. S. Forest Service, Albuquerque, New Mexico

From: N. D. Wygant, Entomologist in Charge By, B. H. Wilford, Entomologist

Subject: Forest Insect Conditions On The Carson National Forest;
Forest Insect Conditions On The Cibola National Forest;
Forest Insect Conditions On The Santa Fe National Forest -
Fall 1949 Survey Reports

Two copies each of the above survey reports are enclosed. One copy of each is being sent to the Supervisor of the Forest concerned and two copies of each are being sent to Dr. Craighead.

In rating use of these Forests recreation apparently is close to the top, hence, demands high priority with respect to protection. Consequently the suggested amounts of control summarized at the ends of the reports concern protection of immediate recreational values.

From the entomological standpoint more control spraying for spruce budworm and Great Basin tent caterpillar is desirable than that which we are advising. Some areas of potential recreational value are excluded or by-passed in the suggested control; also, areas valued for other reasons, as pointed out in the reports, are not included. However, it might prove out just as well to start on a program of the size in the summaries, do it well, and prepare for a more thorough clean-up and maintenance the following years.

The summaries for defoliator control total as follows:

Carson National Forest		
Great Basin tent caterpillar	14,000 acres	$21,000.00
	700 acres	875.00
Cibola National Forest		
Spruce Budworm	4,800 acres	7,200.00
Santa Fe National Forest		
Great Basin tent caterpillar	8,000 acres	12,000.00
Spruce Budworm	500 acres	625.00
	28,000 acres	$41,700.00

2-Regional Forester-11/30/49

Summary by method for defoliator control:

Aircraft spraying		
Great Basin tent caterpillar	14,000 acres	$21,000.00
Great Basin tent caterpillar	8,000 acres	12,000.00
Spruce budworm	4,800 acres	7,200.00
	26,800 acres	$40,200.00
Mist-blower spraying		
Great Basin tent caterpillar	700 acres	875.00
Spruce budworm	500 acres	625.00
	1,200 acres	$ 1,500.00

The urgency for direct control of defoliator outbreaks in the accessible and generally small areas, together with the need for maintenance control in these same and similar places, and the proven usefulness of mist-blowing for forest insect control suggests the need for a mist-blower in the Region. Since a mist-blower will be a new implement for the Region it probably will be advisable to have one only for preliminary uses. The suggested acreage for mist-blower use will be enough to amply substantiate or disprove the practicability of the mist-blower for Forest Service use. The two suggested jobs for the 1950 mist-blower work can be coordinated. In addition there might be time and a distinct advantage to do some other small but desirable control operations in the Region by mist-blower.

The operation of a mist-blower is not difficult. Care and good judgement, however, are needed by the operator to do a good job. Not that this is any more necessary than for other methods of spraying, but unfortunately the advanced publicity that mist-blowers, DDT, and concentrated sprays received carried with it the impression that the human element could be forgotten. That impression needs to be changed.

With regard to the bark beetle infestation on the Sandia Mountain, control by felling and burning will be satisfactory , but we believe felling and spraying will be more feasible. In either case the treated trees will not remain as snags.

Should you wish to discuss the preliminary and other phases of the jobs with us please feel free to suggest the time and place.

B.H. Wright

cc: Dr. Craighead
Carson National Forest
Cibola National Forest
Santa Fe National Forest

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TIMBER MANAGEMENT

FOREST INSECT CONDITIONS ON THE CARSON NATIONAL FOREST FALL 1949

A survey of forest insect conditions on the Carson National Forest was made from September 9 to September 17. Only one insect, the Great Basin tent caterpillar (Malacosoma fragilis Stretch), was found in outbreak or threatening numbers.

Great Basin Tent Caterpillar

The Great Basin tent caterpillar defoliated large areas of aspen during 1949, extending and intensifying the damage caused in 1948.

During the survey counts and tabulations were made of the old (1948) and new (1949) egg masses on sampled trees, and estimates were made of the damage already suffered by and the expected (1950) injury to the aspens.

In some areas the outbreak is of an especially serious nature and of immediate concern. It is interfering greatly with recreation by vacationers and with water use by native residents.

Few aspens have been killed but there is reasonable expectation, based on the histories of past outbreaks of this pest, that repeated defoliation may cause considerable tree mortality. As a consequence there will be a threat to watershed protection and values, recreational uses will be disrupted, and there will be a loss of a potential crop-tree.

The evident seriousness of a heavy outbreak of this tent caterpillar, such as in 1949 on parts of the Rio Pueblo District where vacationers were driven away by the caterpillars, might serve as a forecast of what to expect in other aspen stands where the infestations now may be relatively light but on the increase.

Control of the Great Basin tent caterpillar can be left to nature, as it often has been in the past. Parasites and predators build up, disease sometimes

flourishes and the pest is reduced to endemic numbers. Or, prior to the build-up of these controlling factors, the pest will have multiplied to extensive numbers and eaten itself out of food, starving down to endemic proportions. Serious damage and annoyance results, however, if such controls are relied upon.

Poison sprays applied to aspens will reduce damage considerably, even prevent all damage. The major problem of this form of artifical control in the forest, however, even when proper sprays are used, is one of application. There are three possible means of applying sprays to forest trees, (1) by conventional hydraulic spray rig, (2) by one of the recently developed mist-blowers, and (3) by aircraft.

Hydraulic rigs have been used effectively but to a limited extent in forest tree spraying. Their use, other than along roadsides, is costly and time consuming. Unless aspen infestations are at close range, it would be inadvisable to use a hydraulic rig.

Mist-blowers too, have been used for forest tree spraying. Their use, generally, is limited to and considered primarily for roadside spraying. With certain wind conditions and properly handled, however, they have done excellent jobs inexpensively at distances up to 1000 feet from the machines. There are a few areas of aspen on the Forest where a mist blower can be used to decided advantage over any other means of spray applications.

Airplanes (fixed-wing) and helicopters have been used for forest tree spraying where spraying by other means is impossible. The majority of the aspen areas on the Carson can be sprayed only by aircraft. The terrain, however, being rough and rugged, will require the services of competent men and equipment for effective applications of the poisons.

An advisable spray for tent caterpillar control is a 12½ percent DDT oil solution, applied at the rate of one pound of DDT (one gallon of solution) per acre by either mist blower or aircraft.

The sprays should be applied in late spring when the larvae are hatching, about the time of leaf-bud opening. Effective control with DDT sprays can be assured if the applications are made even prior to hatching. Spray applications after the larvae have hatched and have begun to feed will control the pest; some damage to the foliage will already have resulted. The advisable time for spray application necessarily will vary with elevation and location but spraying should begin by mid-May.

Rio Pueblo Ranger District

Aspen defoliation by the Great Basin tent caterpillar has been occurring for the past several years, becoming very extensive and intensive in 1949. An estimated 28,000 acres of the 40,000 acres of aspen were infested. The infestations appear to be spreading up the drainages from the concentrations on the Rio Pueblo and Rio La Junta. Of the infested acres nearly 14,000 are of importance from the aesthetic and recreational standpoints, the aspen on the rest are of importance primarily for watershed protection or as a potential crop-tree.

Examinations reveal that in 1950 the infestations will be as severe as in 1949, the defoliation will be as complete and the consequent damage to the trees probably greater. The evidence points to a spread of the pest into parts of the uninfested aspen. Some of these latter areas are of recreational or aesthetic value.

Applications of DDT sprays to the infested stands of aesthetic and recreational value, approximately 14,000 acres, is advisable. Spraying of the other 14,000 acres is desirable. While some few areas on the district could be sprayed by mist-blower these areas comprise only a small proportion of the aspen stand and are easy targets for aircraft spraying. The rest of the infested aspen can be sprayed only from the air.

An important factor in aircraft spraying is the accessibility of an air strip to the target. There are two areas in the Rio Pueblo District that might be suitable for airplane take-off and landings. One, at Angostura Camp, is on private property, but may be unavailable if cattle are brought into it for pasturing. The other, partly on government property and available, is in Raton Canyon. Either of these areas would be readily accessible to trucks, favorable for storage, and within a short distance of the targets. Some strip preparation at either place may be necessary but, especially in Raton Canyon, should be easy and necessitate only bull-dozer work.

Taos Ranger District

Aspen defoliation on the Taos District has been and presumably will be intensive in Hondo Canyon. There are approximately 700 acres of aspen of aesthetic and recreational value that should be protected from further damage. Aircraft could be used for spray applications but the greater part of the area can be treated by mist-blower from accessible roads and parks, provided the spray operators take proper advantages of winds and air currents.

Examinations of aspen above Goose Creek off of Red River Canyon do not suggest the need for defoliator control in 1950.

SUMMARY OF SUGGESTED CONTROL

Insect	District	Primary Use	No. Units	Control Method	Cost Unit	Cost Total
Great Basin tent caterpillar	Rio Pueblo	recreation	14,000 acres	aircraft	$1.50/A	$21,000.00
	Taos	recreation	700 acres	mist-blower	1.25/A	875.00
						$21,875.00

Submitted by,

B. H. Wilford

B. H. Wilford
Entomologist

cc: Regional Forester (2)
Dr. Craighead (2)
Carson National Forest (1)

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November 30, 1949

FOREST INSECT CONDITIONS ON THE CIBOLA NATIONAL FOREST FALL 1949

A cursory survey of forest insect conditions on the Cibola National Forest was made from September 15 to September 20. Four insects of immediate concern were investigated, the spruce budworm (Archips fumiferana (Clem.)), the fir engraver beetle (Scolytus ventralis Lec.), the Great Basin tent caterpillar (Malacosoma fragilis Stretch), and a pine sawfly (Neodiprion sp.)

These four insects were very destructive on the Forest this year. Indications are that, unless artificial control measures are taken now, the first three of them will continue in epidemic numbers and cause additional and increased losses. The sawfly needs only to be watched for possible flare-ups that might warrant the application of control measures.

Spruce Budworm

Sandia Ranger District

Douglas-fir and white fir along the Loop Drive from Tree Springs up to and on the La Madera ski area had been defoliated by the budworm to the extent that many of the white firs were weakened, then attacked and killed by the fir engraver beetle. These trees are primarily of aesthetic and recreational value, and necessary to the ski area.

The firs at the Capulin picnic area and in approximately 4800 acres north, south and west of it (overlapping the Tree Springs-La Madera area) were defoliated this year. The infestation threatens to continue. If it does, bark beetles probably will attack and kill the weakened firs. Also, the damage to the defoliated reproduction will be severe.

These trees and reproduction are of tremendous recreational value; the reproduction also is of importance from the standpoint of its proximity to a growing Christmas tree market.

Control of the spruce budworm on these 4800 acres is imperative. It can be accomplished by spraying the area with a 12½ percent DDT-oil solution at the rate of one pound of DDT (one gallon of spray) per acre. The extent, ruggedness, and general inaccessibility of the area necessitates the use of aircraft for the job.

Application of the spray should be made after the fir buds have opened, part of the current years foliage is damaged, and the larvae are approximately half grown. This necessitates preparation for June spraying.

Mount Taylor Ranger District

Approximately 1000 acres of spruce and Douglas-fir are infested with spruce budworm. The situation is probably of endemic proportions although here too the spruce and fir reproduction is suffering severely. From the Christmas tree stand point, tree values are being reduced.

Control measures are desirable and should be initiated at the time suggested for budworm control on the Sandia District. Aircraft spraying could do the entire job satisfactorily. Much of the area, however, could be adequately sprayed by mist-blower, using the same DDT-oil solution as suggested for aircraft spraying or using a 12½ percent DDT emulsion at the rate of one pound of DDT (one gallon of spray) per acre. Mist-blower applications would do well for reproduction but the heights of many of the trees might be too great for optimum coverage from the ground unless particular care is exercised in operating the machine.

Fir Engraver Beetle

Sandia Ranger District

The white firs, especially those at the ski area, are being attacked and killed by the fir engraver. The area involved comprises approximately 40 acres on which there are an estimated 500 brood trees. As mentioned above, the white firs are necessary to the ski area. Hence, their values are high.

Control of the engraver beetle is essential, and should be started soon enough to do the job before the overwintering beetle brood matures and emerges which means completing the control operations not later than June 15. The brood in each attacked tree should be destroyed either by felling the tree and burning or by felling and spraying with a mixture of one part orthodichlorobenzene and six parts Number 2 fuel oil. Control by felling and spraying might be the most feasible method. After this initial control job, maintenance control together with the aforementioned spruce budworm control will be advisable.

Great Basin Tent Caterpillar

Mount Taylor Ranger District

The Great Basin tent caterpillar caused heavy defoliation in aspen stands during 1948 and 1949. The aspen here, on approximately 1500 acres, is of current importance for watershed protection only; it is of potential importance as a crop-tree and for recreation and aesthetic purposes. The damage to aspen during 1950 as based on egg masses found probably will be heavy. From the entomological viewpoint control is advisable.

The Great Basin tent caterpillar can be readily controlled by applying DDT (12½ percent in oil) to the infested aspens at the rate of 1 pound of DDT (1 gallon of solution) per acre. The major portion of the aspen stands are accessible and could be sprayed by mist-blower.

Pine Sawfly

Zuni Ranger District

An inspection was made of the area bordering and on the District where on August 10 Forester F. N. Newnham reported sawflies defoliating ponderosa pine. Evidence pointed to severe feeding on 1948 needles of ponderosa pines and of some pinon pines in Zuni Canyon, starting 4 miles west of Grants and extending for 4 or 5 miles up the canyon. Heavy damage was concentrated on private lands. Lighter damage was found on Forest Service land.

Examinations of the duff under individual trees on private land revealed very few pupae, indicating high natural insect mortality. In numerous instances thousands of dead larvae were found at the bases of the trees.

A heavy rain fell the day Ranger R. E. Courtney and Forester R. I. Boone collected specimens of larvae. This was followed by a spell of cold weather. High larvae mortality was the probable result.

Most of the specimens mailed on August 10 by Boone had pupated enroute to Fort Collins.

Examinations were made of ponderosa pines in the southwest 1/4 of Sec. 18, T. 10 N., R. 11 W. This is National Forest property which had been cut over approximately 15 years ago. The infestation in this scattered stand was light. Pupae were more numerous in the duff samples here than in the canyon samples.

There appeared to be no immediate need of recommendations for artificial control of sawflies on the Zuni District. However, it will be advisable to watch this tract during the spring and early summer of 1950 for signs of infestation. Stands of ponderosa pine west of this tract should also be watched.

Where and when necessary, sawflies on conifers are relatively easy to control with DDT sprays applied by aircraft or mist-blower at the rate of one pound of DDT (one gallon of 12½ percent DDT solution) per acre. The ponderosa pine stands where sawfly damage was in evidence on the Zuni could be sprayed very readily by mist-blower.

SUMMARY OF SUGGESTED CONTROL

Insect	District	Primary Use	No. Units	Control Method	Cost Unit	Cost Total
Spruce budworm	Sandia	recreation	4800 acres	aircraft	$1.50/A	$7200.00
Fir engraver	Sandia	recreation	500 trees	fell & spray	6.00/t	3000.00
						$10200.00

Submitted by,

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Entomologist

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Dr. Craighead (2)
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Fort Collins, Colorado
November 29, 1949

FOREST INSECT CONDITIONS ON THE SANTA FE NATIONAL FOREST FALL 1949

A general survey of the Santa Fe National Forest was made from September 13 to September 15 to determine current forest insect conditions. Two insects appear of major importance, the Great Basin tent caterpillar (Malacosoma fragilis Stretch) and the spruce budworm (Archips fumiferana (Clem.))

Both these insects caused considerable damage on the Forest in 1949 and threaten to continue and increase in importance. The applications of artificial control measures are advisable.

Great Basin Tent Caterpillar

Large areas of aspen were defoliated by the Great Basin tent caterpillar during 1948. In 1949 the infestation became more intensive and extensive. The evidence collected during this survey suggests that the outbreak will continue and spread.

This tent caterpillar infestation is much more than of passing concern. It already is interfering seriously with the use and influence of the Forest. Of primary concern are (1) the disturbance caused to recreation, (2) the contamination of water used by native residents, and (3) the annoyance to orchardists in and bordering on the Forest. The orchardists claim, and with some justification, that the caterpillars keep invading from the Forest aspens, damaging their sprayed orchards.

Repeated defoliation of aspens may cause considerable tree mortality. This reportedly has happened in past outbreaks on the Santa Fe. However, the consequences of aspen mortality now can be more serious and important than in the past. The Santa Fe, like many other National Forests, is getting more and more public use. The watershed value, alone, is more than of just local concern and the loss of aspen cover for watershed protection would have far-reaching economic effects. The loss of aspen would directly and indirectly reduce the recreational values of the Santa Fe. And, the loss of aspen might cause delay in utilization of a possible crop-tree.

Control of the Great Basin tent caterpillar by artificial means will prevent the heavy losses apt to occur until natural control takes over. Poison sprays on aspens can reduce or prevent all damage by tent caterpillars. Application of the sprays to forest trees is the difficult phase of this type of control. Hydraulic rigs, mist-blowers, and aircraft have been used with varying degrees of practicability. Hydraulic rigs are not feasible excepting for roadside work. A mist-blower, if used by an experienced and conscientious operator, can apply sprays to trees as far as 1000 feet from the machine. Aircraft, either fixed-wing or helicopter, is best suited for spraying forest tree foliage. For this, competent men and equipment are essential.

A 12½ percent DDT-oil solution is an advisable preparation to spray for the control of tent caterpillars. It should be applied at the rate of one pound of DDT (one gallon of solution) per acre by either mist-blower or aircraft.

Most satisfactory control can be assured if the spray is applied when the larvae are hatching, about the time the buds are opening. Application prior to or after hatching will effectively control the insect. If hatching has occurred, however, there will be some noticeable feeding. Advisable spray time will vary with elevation and location but should begin by mid-May.

Las Vegas Ranger District

Approximately 8000 acres of aspen north and west of Chacon, Guadalupita, and Holman, including the Rio La Casa drainage of high recreational value, have been seriously infested with the Great Basin tent caterpillar. The infestation is a threat to the area from the standpoint of watershed protection. Of primary and immediate concern, however, is the annoyance and possible damage that the apparently invading caterpillars have had on the local orchardists. A discussion of this problem with Mr. A. R. Sedillo, county agricultural agent at Mora reveals that while some of the orchardists have been using sprays they have been relying on lead arsenate and wettable DDT, both having little residual value, hence valueless shortly after application. It was suggested to Mr. Sedillo that DDT emulsions or solutions be recommended for better and lasting protection.

Evidently the complaint of the orchardists that the invasion of caterpillars is partly from the unsprayed National Forest aspens is legitimate. But, there are some private stands of aspen that likewise are unsprayed. It is suggested, however, that for the protection of the National Forest trees and to avoid this source of complaint the areas of infested aspen in the northern end of the District be sprayed. These stands are inaccessible except to airplane spraying. Air strips should be available in the agricultural lands close to the infested areas.

Some 6000 acres of aspen in the region of the Beaver Creek Guard Station have been infested by the Great Basin tent caterpillar for at least two years. This is reportedly an area that had been seriously hit approximately 40 years ago. Considerable aspen mortality is said to have resulted after that infestation. The Beaver Creek area is of recreational and watershed value. It can be sprayed only by aircraft. Air strips might best be arranged for in the vicinity of Rociada.

Roadside aspens in the recreational area west of the Gallinas Guard Station have been heavily defoliated by the Great Basin tent caterpillar. These relatively few trees could be sprayed by mist-blower.

Pecos Ranger District

The aspen on Grass Mountain comprise a stand of about 500 acres of which 100 acres were heavily infested in 1949; egg mass counts indicate a more severe and extended infestation for 1950. This area is small and of little real or potential value. It could be sprayed to good advantage by mist-blower.

The aspen on Willow Creek covers approximately 500 acres, of which nearly 50 acres were badly defoliated in 1949. This aspen, too, is of little real or potential value. It is only partly accessible for mist-blower work; it could be sprayed by aircraft if and when the Beaver Creek area is sprayed.

Colonias Ranger District

The area of aspen defoliation in Largo Canyon comprises approximately 5000 acres. Its value is restricted mostly to watershed protection. It is used only slightly for recreation and it has no immediate timber value. The area is relatively inaccessible and could be sprayed effectively only by aircraft.

Tesuque Ranger District

The aspen along the road and at Aspen Basin are of high recreational and aesthetic value. Fortunately, no evidence of defoliation by the Great Basin tent caterpillar was observed. This was similarly the case in Black Canyon, east of Hyde Park, excepting that in Black Canyon one 1949 egg mass was found.

There is no apparent immediate need for control preparations here. It will be advisable, however, to maintain careful observations in the area so that light infestations can be readily attacked. The distribution of aspen is such that mist blower applications can be used for the most part.

Spruce Budworm

Spruce budworm infestations of Douglas-fir and spruce on the Santa Fe National Forest vary from generally endemic on the Las Vegas, Pecos, Colonias, and Tesuque Ranger Districts to heavy on the Cuba and Jemez River Districts.

During the past year the sale of Christmas trees and trees for ornamental plantings from this Forest has grown. The market for these products should continue to increase.

In some areas the spruce budworm has seriously and irreparably damaged reproduction which otherwise would have a good market value. In other areas the damage to spruce and fir reproduction is so severe that, if control measures were begun now on the already damaged trees, several years of protection might be necessary before well formed and foliaged trees can be harvested. Control of the insect is advisable if a commercial value is placed on the reproduction.

In other areas the insect is lightly infesting trees that are of high recreational value.

Control of the insect in these areas is advisable.

The spruce budworm can be controlled by spraying the foliage of the infested trees with a 12½ percent DDT-oil solution at the rate of one pound of DDT (one gallon of spray) per acre by either mist-blower or aircraft.

Applications of the spray should be made after the buds have opened and the larvae are approximately half grown, probably in June.

Cuba and Jemez River Districts

On both these Districts the damage to spruce and Douglas-fir trees is heavy but not severe enough yet to have resulted in complete defoliation or bark beetle attacks. The infestations, however, have been intensive enough to result in practically complete loss of much of the spruce and fir reproduction, as on the ridge between Rio San Antonio and Sulphur Creek near La Cueva, and in the area near the Las Conchas Guard Station. Similarly, there is spruce budworm damage to timber trees and reproduction on the ridge east of Rabbit Mountain which runs 9 miles south towards San Miguel Dome from State Route 4. The spruce and fir reproduction extends along the entire ridge but occurs in scattered groups. Not all areas of spruce and fir reproduction on these two Districts have been damaged by spruce budworm. One such area is the Presa Creek drainage in the vicinity of the Rio Las Vacas Guard Station where no indication of budworm damage to reproduction was observed. This is an area where ornamental trees are being removed and a heavy Christmas tree harvest is expected this year. The occurrence of budworm infestation near this area, however, suggests that the reproduction be watched so control efforts might be initiated when first attacks occur.

The estimated total of the areas on the Jemez River District in need of protection comprises about 3000 acres. The greater portion of these areas could be sprayed by mist-blower. No damage was observed on the Cuba District on this year's potential crop of Christmas trees.

Tesuque Ranger District

Only light infestations of spruce budworm were observed on this District but some limited control is advisable. A mist-blower can do a satisfactory job. It also will be advisable to keep careful and continued observations of the trees and initiate control measures where and whenever the insect starts working. This District has an especially high recreational value and warrants the initiation of insect control measures before the insects build up beyond endemic proportions.

Approximately 500 acres in the vicinity of Aspen Basin are in this category and should be sprayed in 1950.

SUMMARY OF SUGGESTED CONTROL

Insect	District	Primary Use	No. Units	Control Method	Cost Unit	Cost Total
Great Basin tent caterpillar	Las Vegas	recreation	8000 acres	aircraft	$1.50/A	$12,000.00
Spruce budworm	Tesuque	recreation	500 acres	mist-blower	1.25/A	625.00
						$12,625.00

Submitted by,

B. H. Wilford

B. H. Wilford
Entomologist

cc: Regional Forester (2)
Dr. Craighead (2)
Santa Fe National Forest (1)